

*Amendments to the Claims*

The listing of claims below will replace all prior versions and listings of claims in the present application.

*Claim Listing*

1. (New) An apparatus comprising:  
a network interface element configured to receive an inbound packet at a line rate; and  
a control element coupled to said network interface element and configured to  
determine a packet priority associated with said inbound packet substantially  
at said line rate.
2. (New) The apparatus of claim 1, wherein  
said control element comprises,  
a first buffer configured to store said inbound packet, and  
an inbound queue manager configured to store at least a portion of said  
inbound packet using a second buffer; and  
said second buffer is substantially larger than said first buffer.
3. (New) The apparatus of claim 2, wherein said control element comprises:  
a control element configured to perform rate limiting on a plurality of packets  
including said inbound packet substantially at said line rate.
4. (New) The apparatus of claim 2, wherein said inbound queue manager  
comprises a buffer usage manager.
5. (New) The apparatus of claim 2, wherein said control element comprises:  
a control element configured to determine a class of service associated with said  
inbound packet.

6. (New) The apparatus of claim 5, wherein said inbound packet comprises a header and a tail; and said control element further comprises:
  - an inbound receiver comprising said first buffer;
  - a lookup circuit coupled to said inbound receiver and configured to compare said header to a data structure and to determine routing information;
  - and
  - a first packet modifier circuit configured to modify said header according to at least said routing information to form a modified packet;
7. (New) The apparatus of claim 6, wherein said inbound queue manager comprises:
  - an inbound queue manager coupled to said first packet modifier circuit and configured to store said modified packet using said second buffer.
8. (New) The apparatus of claim 6, wherein said data structure comprises an M-way branching tree structure.
9. (New) The apparatus of claim 2, wherein said control element further comprises:
  - an outbound receiver comprising a third buffer configured to store an outbound packet substantially at said line rate;
  - a second packet modifier circuit configured to modify said outbound packet substantially at said line rate; and
  - an outbound queue manager coupled to said second packet modifier circuit and configured to store said outbound packet using a fourth buffer, wherein said fourth buffer is substantially larger than said third buffer.
10. (New) A method comprising:
  - storing an inbound packet using a network interface; and
  - determining a packet priority associated with said inbound packet substantially at a line rate of said network interface.

11. (New) The method of claim 10, wherein said storing comprises:  
storing an inbound packet using a first buffer of said network interface.
12. (New) The method of claim 11, further comprising:  
storing at least a portion of said inbound packet using a second buffer of said network interface in response to said determining, wherein  
said second buffer is substantially larger than said first buffer.
13. (New) The method of claim 12, further comprising:  
performing rate limiting on a plurality of packets including said inbound packet  
substantially at said line rate of said network interface.
14. (New) The method of claim 12, wherein said determining comprises:  
determining a class of service associated with said inbound packet.
15. (New) The method of claim 14, wherein  
said inbound packet comprises a header and a tail; and  
said method further comprises:  
    comparing said header to a data structure substantially at said line rate of said network interface;  
    determining routing information substantially at said line rate of said network interface; and  
    modifying said header according to at least said routing information to form a modified packet substantially at said line rate of said network interface.
16. (New) The method of claim 15, wherein said comparing comprises:  
comparing said header to an M-way branching tree structure.
17. (New) The method of claim 15, wherein said storing at least a portion of said inbound packet using a second buffer of said network interface in response to said determining comprises:  
storing said modified packet using said second buffer.

18. (New) The method of claim 17, wherein said storing said modified packet using said second buffer comprises:

managing buffer usage.

19. (New) The method of claim 12, further comprising:

storing an outbound packet using a third buffer of said network interface;

modifying said outbound packet substantially at said line rate of said network interface; and

storing said outbound packet using a fourth buffer of said network interface in response to said modifying, wherein

said fourth buffer is substantially larger than said third buffer.

20. (New) A machine-readable medium having a plurality of instructions executable by a machine embodied therein, wherein said plurality of instructions when executed cause said machine to perform a method comprising:

storing an inbound packet using a network interface; and

determining a packet priority associated with said inbound packet substantially at a line rate of said network interface.

21. (New) The machine-readable medium of claim 20, wherein said storing comprises:

storing an inbound packet using a first buffer of said network interface.

22. (New) The machine-readable medium of claim 21, said method further comprising:

storing at least a portion of said inbound packet using a second buffer of said network interface in response to said determining, wherein

said second buffer is substantially larger than said first buffer.

23. (New) The machine-readable medium of claim 22, said method further comprising:

performing rate limiting on a plurality of packets including said inbound packet substantially at said line rate of said network interface.

24. (New) The machine-readable medium of claim 22, wherein said determining comprises:

determining a class of service associated with said inbound packet.

25. (New) The machine-readable medium of claim 24, wherein said inbound packet comprises a header and a tail; and said method further comprises:

comparing said header to a data structure substantially at said line rate of said network interface;

determining routing information substantially at said line rate of said network interface; and

modifying said header according to at least said routing information to form a modified packet substantially at said line rate of said network interface.

26. (New) The machine-readable medium of claim 22, said method further comprising:

storing an outbound packet using a third buffer of said network interface;

modifying said outbound packet substantially at said line rate of said network interface; and

storing said outbound packet using a fourth buffer of said network interface in response to said modifying, wherein

said fourth buffer is substantially larger than said third buffer.

27. (New) An apparatus comprising:

means for storing an inbound packet using a network interface; and

means for determining a packet priority associated with said inbound packet substantially at a line rate of said network interface.

28. (New) The apparatus of claim 27, wherein said means for storing comprises: means for storing an inbound packet using a first buffer of said network interface.

29. (New) The apparatus of claim 28 further comprising:  
means for storing at least a portion of said inbound packet using a second buffer of  
said network interface, wherein  
said second buffer is substantially larger than said first buffer.
30. (New) The machine-readable medium of claim 29, further comprising:  
means for performing rate limiting on a plurality of packets including said inbound  
packet substantially at said line rate of said network interface.
31. (New) The apparatus of claim 29, wherein said means for determining  
comprises:  
means for determining a class of service associated with said inbound packet.
32. (New) The apparatus of claim 31, wherein  
said inbound packet comprises a header and a tail; and  
said apparatus further comprises:  
means for comparing said header to a data structure substantially at said line  
rate of said network interface;  
means for determining routing information substantially at said line rate of  
said network interface; and  
means for modifying said header according to at least said routing information  
to form a modified packet substantially at said line rate of said network  
interface.
33. (New) The apparatus of claim 29, further comprising:  
means for storing an outbound packet using a third buffer of said network interface;  
means for modifying said outbound packet substantially at said line rate of said  
network interface; and  
means for storing said outbound packet using a fourth buffer of said network interface  
in response to said modifying, wherein  
said fourth buffer is substantially larger than said third buffer.